

Army Test and Evaluation Command



# Test and Evaluation of System-of-Systems

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*Army Proven  
Battle Ready*

# ITED Mission

*ATEC established the Integrated Test & Evaluation Directorate (ITED) to plan, coordinate, and conduct integrated operational tests, experiments and rapid acquisition initiative assessments in support of network integration and other priority Army systems.*



*ITED maintains close ties with the Brigade Modernization Command and System of systems Integration (SOSI) to plan, coordinate, and execute operational testing in a network-centric operational environment.*

# Network Integration Evaluation

## What is the NIE?

The Network Integration Evaluation (NIE) is a series of *semi-annual evaluations* designed to integrate and mature the Army's tactical network.

- Conduct **integrated and parallel Operational Tests** of select Army programs of record.
- Evaluate development and **emerging network capabilities** in an operational environment.
- Assess **non-networked capabilities** in an **integrated operational environment**.



***It's a new way of doing business –  
a fundamental change in how we deliver capabilities to our Soldiers***

# Network Integration Evaluation

## What Makes the NIE Different?

### *The “Adaptive” Evaluation Concept:*

- **Integrated** evaluations of capabilities **rather than discrete** evaluations
- Synchronized and consolidated feedback loop – **two evaluations per year**
- Evaluation and integration from **Platoon to BCT** levels
- Tactical environment covering **12,000 sq. km of complex terrain and airspace**
- Includes opportunities for **integrating industry solutions and emerging technologies** in parallel
- Established a **network baseline** for incremental modernization
- **The Business Case: Reduced costs thru efficiency & competition, quicker cycle times, and rapid technology insertions**



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# Network Integration Evaluation

(FY12 => NIE 12.1 & NIE 12.2)



## Army Objectives

- Establish the *Objective Integrated Network Baseline*
- Evaluate *integration of Aerial/Ground Networks*
- Evaluate the *Mission Command capabilities available at Command Posts, while on the move and to the dismounted Soldier*
- Accomplish required evaluations in support of *POR milestones and decisions.*
- Introduce *industry participation into the NIE construct based on TRADOC identified network capability gaps.*
- Refine assessment of *Network Vulnerabilities*

## Network Priorities

- *Mission Command on the Move (MCTOM)*
- *Soldier Connectivity*
- *Command Posts / Mission Command Operations*
- *Aerial Tier / Aviation Integration*
- *Network Operations*
- *Scalability*

## Intent

- Test and demonstrate the *technical and operational capabilities* of the tactical network components
- NIE 12.1 is a *risk mitigation event* intended to *establish the baseline network architecture* of NIE 12.2
- Evaluate the *integration and effectiveness* of non-network systems into combat operations



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# NIE 12.1 Complexity



## Complexity / Innovation = Network Integration

- ✓ 2 x Systems Under Test; 47 Systems Under Evaluation
- ✓ Lower Tactical Internet
  - ✓ 8 x Separate Handheld Configurations
  - ✓ 6 x Different Transport Devices
- ✓ Mid-Tier Tactical Internet
  - ✓ 4 x Different Transport Systems Supporting Multiple Waveforms
  - ✓ 3 x Different Aerial Retrans Platforms
- ✓ Upper Tactical Internet
  - ✓ 3 x Different Systems
  - ✓ 2 x Different Aerial Network Thickening Systems
- ✓ 2 x Unique Mission Command on the Move Systems (Inc 2; GNOMAD)
- ✓ 29 x NETOPS Tools
- ✓ More than 100 Unique Frequency Requests
- ✓ 23 Major NIPRNET Nodes; 39 Major SIPRNET Nodes
- ✓ > 3000 Separate Pieces of Equipment Installed

### Goals:

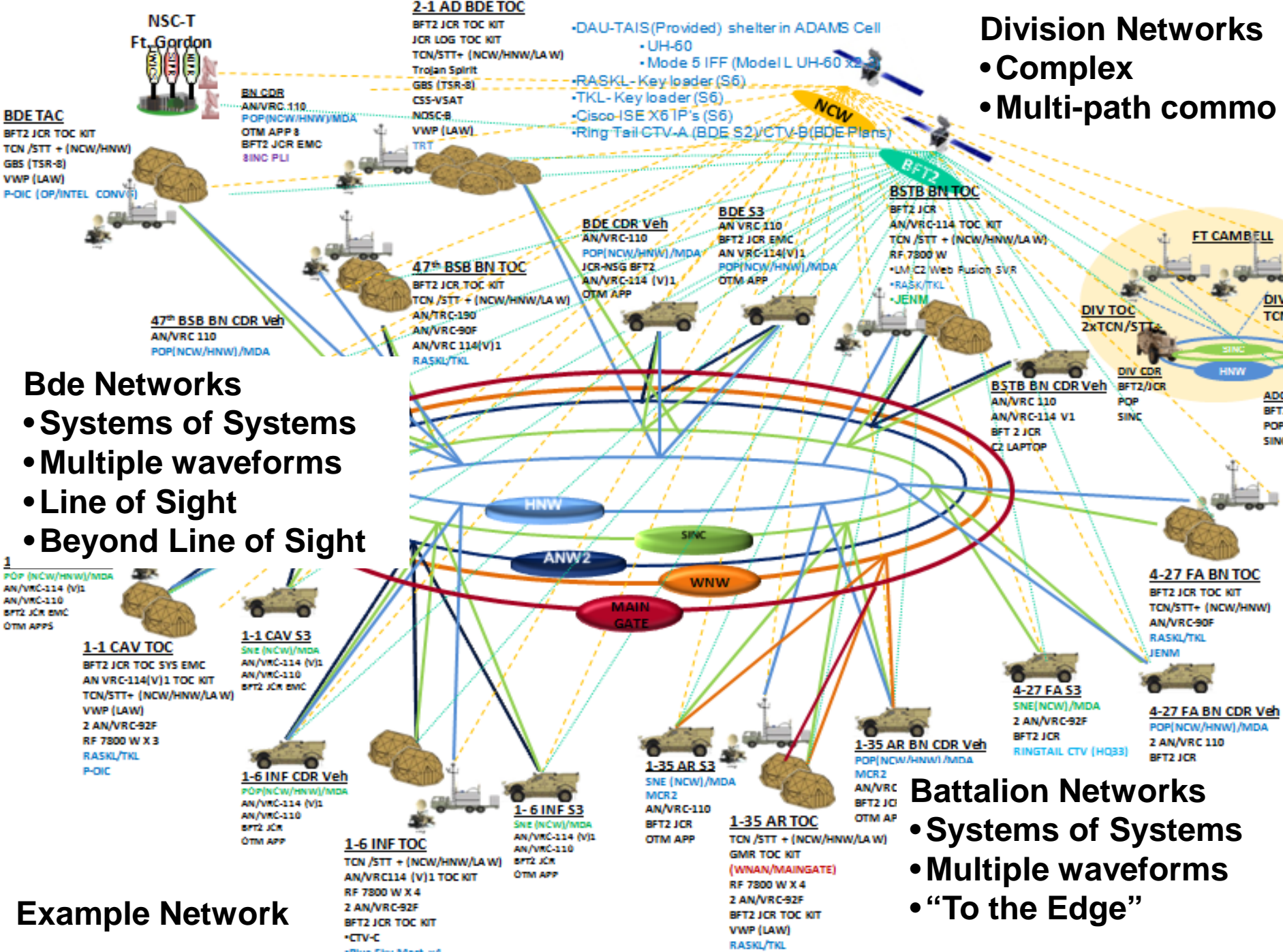
- Interoperable
- Technically Integrated
- FSR Supportable



*TRIAD Teamwork and Innovation Enabled Network Integration*

# Division Networks

- Complex
- Multi-path commo



# Bde Networks

- Systems of Systems
- Multiple waveforms
- Line of Sight
- Beyond Line of Sight

# Example Network

# Battalion Networks

- Systems of Systems
- Multiple waveforms
- "To the Edge"

**BDE TAC**  
 BFT2 JCR TOC KIT  
 TCN /STT + (NCW/HNW)  
 GBS (TSR-8)  
 VWP (LAW)  
 P-OIC (OP/INTEL CONV)

**BN CDR**  
 AN/VRC.110  
 POP(NCW/HNW)/MDA  
 OTM APP 8  
 BFT2 JCR EMC  
 8INCC PLI

**2-1 AD BDE TOC**  
 BFT2 JCR TOC KIT  
 JCR LOG TOC KIT  
 TCN/STT+ (NCW/HNW/LAW)  
 Trojan Spirit  
 GBS (TSR-8)  
 CSS-VSAT  
 NOSC-B  
 VWP (LAW)  
 TRT

•DAU-TAIS(Provided) shelter in ADAMS Cell  
 •UH-60  
 •Mode 5 IFF (Model L UH-60)  
 •RASKL- Key loader (S6)  
 •TKL- Key loader (S6)  
 •Cisco-ISE X6 IP's (S6)  
 •Ring Tail-CTV-A (BDE S2)/CTV-B (BDE Plans)

**BSTB BN TOC**  
 BFT2 JCR  
 AN/VRC-114 TOC KIT  
 TCN /STT + (NCW/HNW/LAW)  
 RF 7800 W  
 •LM C2 Web Fusion SVR  
 •RASK/TKL  
 •JENM

**BDE CDR Veh**  
 AN/VRC-110  
 POP(NCW/HNW)/MDA  
 JCR-NSG BFT2  
 AN/VRC-114 (V1)  
 OTM APP

**BDE S3**  
 AN/VRC 110  
 BFT2 JCR EMC  
 AN VRC-114(V1)  
 POP(NCW/HNW)/MDA  
 OTM APP

**47th BSB BN CDR Veh**  
 AN/VRC 110  
 POP(NCW/HNW)/MDA

**47th BSB BN TOC**  
 BFT2 JCR TOC KIT  
 TCN /STT+ (NCW/HNW/LAW)  
 AN/TRC-190  
 AN/VRC-90F  
 AN/VRC 114(V1)  
 RASKL/TKL

**FT CABBELL**  
 DIV TOC  
 2xTCN/STT+  
 SINC  
 HNWW

**BSTB BN CDR Veh**  
 AN/VRC 110  
 AN/VRC-114 V1  
 BFT 2 JCR  
 C2 LAPTOP

**DIV CDR**  
 BFT2/JCR  
 POP  
 SINC

**4-27 FA BN TOC**  
 BFT2 JCR TOC KIT  
 TCN/STT+ (NCW/HNW)  
 AN/VRC-90F  
 RASKL/TKL  
 JENM

**4-27 FA S3**  
 SNE(NCW)/MDA  
 2 AN/VRC-92F  
 BFT2 JCR  
 RINGTAIL CTV (HQ33)

**4-27 FA BN CDR Veh**  
 POP(NCW/HNW)/MDA  
 2 AN/VRC 110  
 BFT2 JCR

**1-1 CAV TOC**  
 BFT2 JCR TOC SYS EMC  
 AN VRC-114(V1) TOC KIT  
 TCN/STT+ (NCW/HNW/LAW)  
 VWP (LAW)  
 2 AN/VRC-92F  
 RF 7800 W X3  
 RASKL/TKL  
 P-OIC

**1-1 CAV S3**  
 SNE (NCW)/MDA  
 AN/VRC-114 (V1)  
 AN/VRC-110  
 BFT2 JCR EMC

**1-6 INF CDR Veh**  
 POP(NCW/HNW)/MDA  
 AN/VRC-114 (V1)  
 AN/VRC-110  
 BFT2 JCR  
 OTM APP

**1-6 INF TOC**  
 TCN /STT + (NCW/HNW/LAW)  
 AN/VRC114 (V1) TOC KIT  
 RF 7800 W X 4  
 2 AN/VRC-92F  
 BFT2 JCR TOC KIT  
 •CTV-C  
 •Blue Sky Mast x4

**1-6 INF S3**  
 SNE (NCW)/MDA  
 AN/VRC-114 (V1)  
 AN/VRC-110  
 BFT2 JCR  
 OTM APP

**1-35 AR S3**  
 SNE (NCW)/MDA  
 MCR2  
 AN/VRC-110  
 BFT2 JCR  
 OTM APP

**1-35 AR TOC**  
 TCN /STT + (NCW/HNW/LAW)  
 GMR TOC KIT  
 (WNAN/MAINGATE)  
 RF 7800 W X 4  
 2 AN/VRC-92F  
 BFT2 JCR TOC KIT  
 VWP (LAW)  
 RASKL/TKL

**1-35 AR BN CDR Veh**  
 POP(NCW/HNW)/MDA  
 MCR2  
 AN/VRC  
 BFT2 JCR  
 OTM AP

# Distributed Testing

## Challenges:

- *Common understanding of the test objectives*
- *Understanding single system impacts on the systems of systems*
- *Reliable network (fiber, microwave, mesh network, Satellite)*
- *Understand Test Equipment capabilities & limitations*
- *Test equipment “Can not help nor hinder unit/system under test”*
- *Plan, and validate ability to collect and transport data collected (schedule or “real Time”)*
- *Access to “shared” data repositories (access & “Need to Know”)*





# Distributed Testing

## Benefits:

- *Potential Reduced Test Cost*
- *Leveraging lesson learned from integrating systems of systems*
- *Opportunities to leverage the “best of Breed” technologies*
- *Opportunities to conduct Joint, Multi-national SoS integration*



**Let not a Soldier’s Soul cry out, “Was my equipment tested ??”**

